

WHAT IS CLAIMED IS:

1. A video encoding method for video encoding apparatus to encode a moving picture partitioned into a plurality of regions, the video encoding method comprising:

5 a step of determining an encoding mode of each image in encoding a moving picture consisting of a plurality of images;

a step of determining a region structural unit for partitioning said image into multiple regions, based on said  
10 encoding mode;

a step of defining the regions on the basis of the region structural unit;

a step of encoding region information about the regions thus defined;

15 a step of compression-encoding pixel data included in the regions, in encoding units to generate compression-encoded data according to the encoding mode; and

an output step of outputting the encoding mode, the  
20 region information, and the compression-encoded data.

2. The video encoding method according to Claim 1, wherein said encoding mode is one selected from:

a frame mode of performing encoding without separating scan lines constituting an image;

25 a field mode of performing encoding with separating scan lines constituting an image;

an encoding-unit-switching mode of dividing an image into a plurality of encoding units and performing encoding in each encoding unit by either the frame mode or the field mode;

5            an image-unit-switching mode of performing encoding in each image unit by either the frame mode or the field mode;

a first combination mode as a combination of the frame mode with the encoding-unit-switching mode; and

10           a second combination mode as a combination of the field mode with the image-unit-switching mode.

3.        The video encoding method according to Claim 2, wherein each of the encoding units is:

15           a block consisting of  $N \times N$  pixels when the encoding mode is the frame mode;

a block consisting of  $N \times N$  pixels when the encoding mode is the field mode; or

20           a block consisting of  $N \times M$  ( $M$  is a number of vertical pixels, and  $M=2N$ ) pixels when the encoding mode is the encoding-unit-switching mode.

4.        The video encoding method according to Claim 3, wherein when all the images constituting the moving picture are encoded in one encoding mode, the region structural unit is the encoding unit, and

25           wherein when the images constituting the moving picture are encoded each in different encoding modes, the region

structural unit is a largest encoding unit among the encoding units of the different encoding modes.

5        5.     A video decoding method for video decoding apparatus to decode compression-encoded data of a moving picture partitioned into a plurality of regions, the video decoding method comprising:

10            a step of effecting input of compression-encoded data generated from each of images constituting a moving picture, by partitioning said image into multiple regions and implementing compression encoding thereof;

          a step of determining an encoding mode of each image from the compression-encoded data;

15            a step of determining a region structural unit for partitioning the image into multiple regions, based on the encoding mode;

          a step of acquiring region information about the regions from the compression-encoded data;

          a step of defining the regions, based on the region structural unit and the region information;

20            a step of decoding the compression-encoded data included in the regions thus defined, in encoding units to generate regenerated data in encoding units; and

25            a step of constructing a regenerated image from the regenerated data in encoding units in accordance with the encoding mode.

6.     The video decoding method according to Claim 5,

wherein said encoding mode is one selected from:

a frame mode of performing encoding without separating scan lines constituting an image;

5 a field mode of performing encoding with separating scan lines constituting an image;

an encoding-unit-switching mode of dividing an image into a plurality of encoding units and performing encoding in each encoding unit by either the frame mode or the field mode;

10 an image-unit-switching mode of performing encoding in each image unit by either the frame mode or the field mode;

a first combination mode as a combination of the frame mode with the encoding-unit-switching mode; and

15 a second combination mode as a combination of the field mode with the image-unit-switching mode.

7. The video decoding method according to Claim 6, wherein each of the encoding units is:

20 a block consisting of  $N \times N$  pixels when the encoding mode is the frame mode;

a block consisting of  $N \times N$  pixels when the encoding mode is the field mode; or

25 a block consisting of  $N \times M$  ( $M$  is a number of vertical pixels, and  $M=2N$ ) pixels when the encoding mode is the encoding-unit-switching mode.

8. The video decoding method according to Claim 7,

wherein when all the images constituting the moving picture are encoded in one encoding mode, the region structural unit is the encoding unit, and

wherein when the images constituting the moving picture are encoded each in different encoding modes, the region structural unit is a largest encoding unit out of the encoding units in the different encoding modes.

9. A video encoding program for letting a computer execute processing associated with the video encoding method as set forth in Claim 1.

10. A video decoding program for letting a computer execute processing associated with the video decoding method as set forth in Claim 5.

11. A video encoding apparatus for encoding a moving picture partitioned into a plurality of regions, the video encoding apparatus comprising:

encoding mode determining means for determining an encoding mode of each image in encoding the moving picture consisting of a plurality of images;

region structural unit determining means for determining a region structural unit for partitioning said image into multiple regions, based on said encoding mode;

region defining means for defining the regions on the basis of the region structural unit;

region information encoding means for encoding region information about the regions thus defined; and

data generating means for compression-encoding pixel data included in the regions, in encoding units to generate compression-encoded data according to the encoding mode.

12. A video decoding apparatus for decoding a moving picture partitioned into a plurality of regions, the video decoding apparatus comprising:

data input means for effecting input of compression-encoded data generated from each of images constituting a moving picture, by partitioning said image into multiple regions and implementing compression encoding thereof;

encoding mode specifying means for specifying an encoding mode of each image from the compression-encoded data;

15 region structural unit determining means for determining a region structural unit for partitioning the image into multiple regions, based on the encoding mode;

region information acquiring means for acquiring region information about the regions from the compression-encoded data;

region defining means for defining the regions, based on the region structural unit and the region information;

regenerated data generating means for decoding the compression-encoded data included in the regions thus defined, in encoding units to generate regenerated data in encoding units; and

regenerated image constructing means for constructing a regenerated image from the regenerated data in encoding units in accordance with the encoding mode.

13. The video encoding method according to Claim 1, wherein, for all the images included in the moving picture,

the region structural unit is a block consisting of  $N \times N$  pixels, in a frame mode of performing encoding without separating scan lines constituting each image,

the region structural unit is a block consisting of  $N \times N$  pixels, in a field mode of performing encoding with separating scan lines constituting each image,

the region structural unit is a block consisting of  $N \times M$  ( $M$  is a number of vertical pixels, and  $M=2N$ ) pixels, in an encoding-unit-switching mode of dividing each image into a plurality of encoding units and performing encoding in each encoding unit by either the frame mode or the field mode, or

the region structural unit is a block consisting of  $N \times M$  ( $M$  is a number of vertical pixels, and  $M=2N$ ) pixels, in an image-unit-switching mode of performing encoding of each image in an image unit by either the frame mode or the field mode.

14. The video decoding method according to Claim 5, wherein, for all the images included in the moving picture,

the region structural unit is a block consisting of  $N \times N$  pixels, in a frame mode of performing encoding without

separating scan lines constituting each image,

the region structural unit is a block consisting of  $N \times N$  pixels, in a field mode of performing encoding with separating scan lines constituting each image,

5 the region structural unit is a block consisting of  $N \times M$  ( $M$  is a number of vertical pixels, and  $M=2N$ ) pixels, in an encoding-unit-switching mode of dividing each image into a plurality of encoding units and performing encoding in each encoding unit by either the frame mode or the field  
10 mode, or

the region structural unit is a block consisting of  $N \times M$  ( $M$  is a number of vertical pixels, and  $M=2N$ ) pixels, in an image-unit-switching mode of performing encoding of each image in an image unit by either the frame mode or the  
15 field mode.

15. A video encoding apparatus comprising:

input means for effecting input of a moving picture consisting of a plurality of images;

encoding mode controlling means for determining an  
20 encoding mode of each image in encoding the moving picture;

region structural unit determining means for determining a region structural unit for partitioning each image into multiple regions, based on the encoding mode;

region partitioning means for defining regions on the  
25 basis of the region structural unit and partitioning each image into multiple regions;



encoding means for compression-encoding region information about the regions thus defined, information of the encoding mode, and pixel data included in the regions to generate compression-encoded data; and

5           outputting means for outputting the compression-encoded data.

16.    A video decoding apparatus comprising:

input means for effecting input of compression-encoded data generated by partitioning each of images constituting a moving picture, into multiple regions and implementing  
10       compression encoding thereof;

encoding mode specifying means for specifying an encoding mode of each image, based on the compression-encoded data;

15       region structural unit determining means for determining a region structural unit for partitioning each image into multiple regions, based on the encoding mode;

region defining means for acquiring region information about the regions, based on the compression-encoded data, and for defining the regions, based on the region structural unit and the region information; and  
20

decoding means for decoding the compression-encoded data included in the regions thus defined, to construct a regenerated image in accordance with the encoding mode.

25